

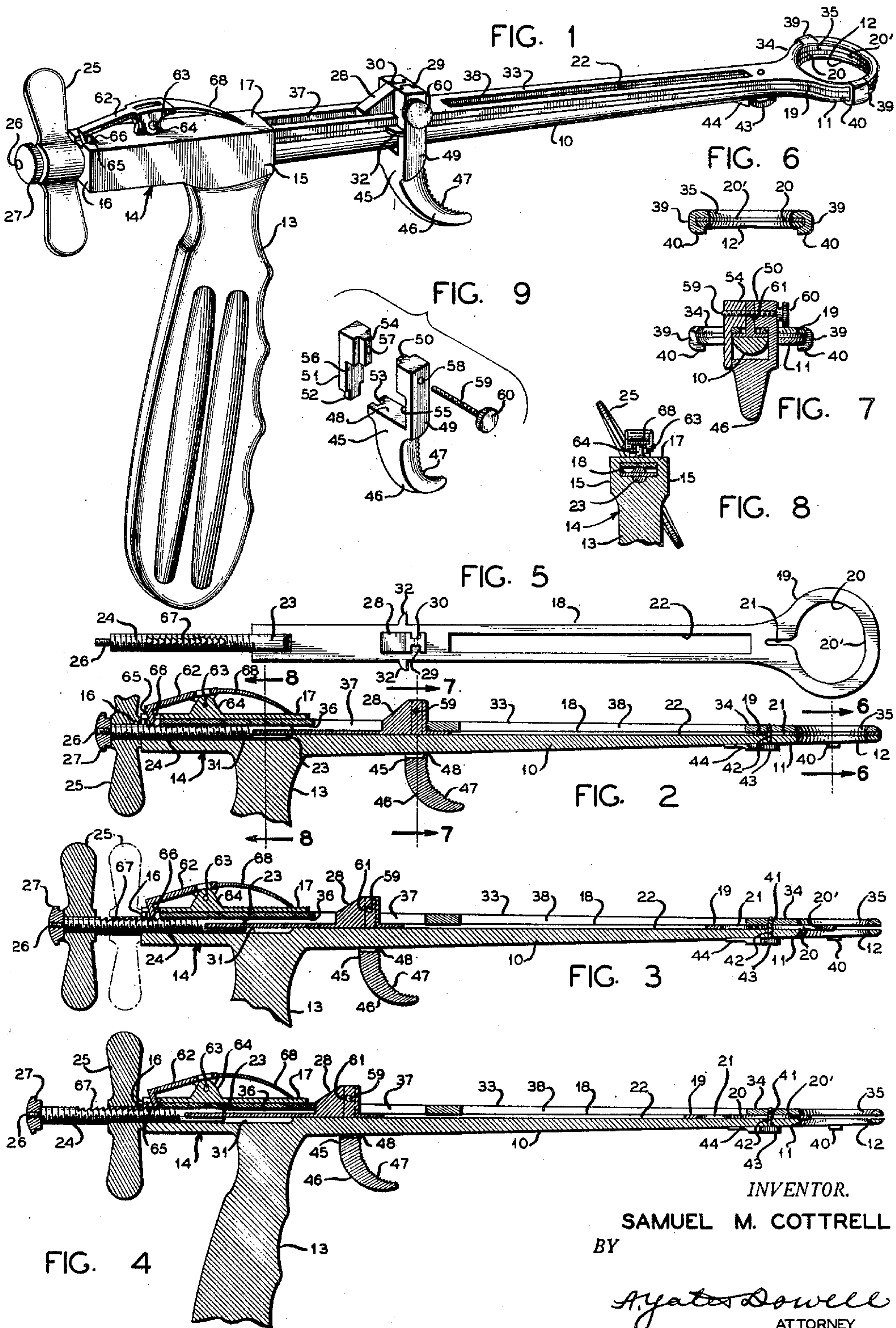
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TONSIL ENUCLEATOR

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TONSIL ENUCLEATOR

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This invention relates to surgical instruments and more particularly to that class of instruments generally referred to as tonsil enucleators.

Devices of this character which have been manufactured heretofore have failed to provide a satisfactory solution to the delicate problems inherent to the surgery with which we are here concerned. Among the more serious inadequacies of the prior art devices, in addition to the complexities of the instruments per se is the possibility of inflicting injury upon the structure adjacent the tonsil, whether by trauma or otherwise.

The vast majority of such instruments as are in common use include an aperture, located at the distal extremity, in which the tonsil is to be received and retained prior to severance. A cutting blade is mounted within the device for reciprocatory movement, appropriate mechanism being provided to advance the blade in a forward direction away from the hand of the surgeon in the performance of the enucleation.

In general, such instruments act to crush the tissue surrounding the tonsil and rely upon a sharpened cutting edge to complete the severance. Since trauma of the anterior and posterior pillars located on either side of the tonsil is to be avoided, extreme care must accompany the use of instruments of this character and, even under the most favorable of circumstances, inadvertent injury and needless crushing of adjacent structure results. In addition, the employment of a sharp cutting blade is generally accompanied by excessive bleeding with discomfort to the patient and the possibility of more serious consequences.

It is accordingly a major object of the present invention to provide an improved tonsil enucleator which will minimize the possibility of inflicting inadvertent injury, whether by trauma or otherwise, to the structures adjacent to the tonsil, particular consideration being given to the posterior and anterior pillars.

It is a further object of the invention to provide an improved tonsil enucleator employing a dull cutting blade in contradistinction to a sharp blade.

It is a still further object of the present invention to provide an improved tonsil enucleator in which the cutting blade travels in a direction away from the posterior and anterior pillars of the tonsil being severed, toward the hand of the surgeon.

It is a still further object of the invention to provide an improved tonsil enucleator including

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novel mechanism for controlling the rate of movement of the cutting blade.

It is a further object of the invention to provide an improved tonsil enucleator which may be firmly and conveniently grasped in the hand of the operator, assuring perfect control of the instrument.

It is a still further object of the present invention to provide an improved tonsil enucleator which is manufactured from a relatively small number of parts and which may be easily assembled and disassembled.

It is a further object of the present invention to provide an improved tonsil enucleator which may be conveniently cleaned and sterilized.

It is a still further object of the invention to provide an improved tonsil enucleator which will be simple in operation, including no complicated parts or mechanism that may get out of order, and which may be economically manufactured.

Further objects and advantages of the invention will be more fully apparent from the following specifications taken in conjunction with the accompanying drawing wherein:

Fig. 1 is a perspective view of a novel tonsil enucleator constructed in accordance with the present invention;

Fig. 2, a longitudinal sectional view through the tonsil enucleator of Fig. 1, a portion of the handle being broken away, illustrating the cutting blade in normal, inoperative position;

Fig. 3, a longitudinal sectional view similar to Fig. 1, illustrating the cutting blade lifted to an intermediate position, where the tonsil will be grasped thereby;

Fig. 4, a longitudinal sectional view, also similar to Fig. 1, illustrating the cutting blade lifted to final position, severance having been completed;

Fig. 5, a top plan view illustrating the cutting blade detached from the instrument;

Fig. 6, a detail transverse sectional view through the distal extremity of the instrument, taken on the line 6—6 of Fig. 2;

Fig. 7, a detail transverse sectional view through the trigger mechanism, taken on the line 7—7 of Fig. 2;

Fig. 8, a detail transverse sectional view through the upper extremity of the instrument, taken on the line 8—8 of Fig. 2; and

Fig. 9, an expanded perspective view illustrating the trigger mechanism detached from the instrument.

With further reference to the drawing, the preferred embodiment of the instrument illus-

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trated comprises a relatively narrow shank or base portion 10 terminating in a slightly enlarged and substantially oval-shaped distal portion 11 provided with a similarly oval-shaped aperture 12. The major axis of the aperture 12 is transversely disposed with respect to the longitudinal axis of the shank 10 and the tonsil to be severed is intended to be received within this aperture.

Preferably the upper surface of the shank is horizontally disposed and the lower surface is gradually tapered, enlarging slightly from front to rear and including a depending handle portion 13 which may, if desired, be formed integrally therewith. As will be more readily apparent from an examination of Fig. 1 of the drawing, the handle 13 is of the pistol grip type, the forward edge thereof including a plurality of arcuate depressions complementarily conformed with respect to the inner surfaces of the fingers of the operator.

Convenience of grasping in either hand is thus provided, assuring perfect control of the instrument. It has been found advantageous to incline the handle portion 13 at a slight rearward angle from the perpendicular, thereby materially assisting in determining the position at which the instrument will be inserted into the oral cavity of the patient. The length of the shank portion 10 is such that the distal extremity of the instrument will conveniently reach to the walls of the patient's throat with the handle portion spaced adequately from the patient's lips to permit visual observation by the surgeon of the operative area.

The proximal extremity of the shank 10, beyond and including the handle portion 13, is provided with an enlarged portion 14 including vertically disposed side walls 15, a transverse end wall 16 and a top wall 17 forming a recessed portion within which the proximal extremities of the cutting blade and the upper blade or top shank portion are received, as will be described more fully hereinafter. The cutting blade 18 is relatively thin and narrow, substantially corresponding in width to the width of the shank portion of the instrument, and terminating in an enlarged and oval-shaped distal portion 19 provided with an oval-shaped aperture 20 substantially identical in size and shape to the aperture 12. A relatively short slot 21, communicating with the aperture 20, is formed in the cutting blade along the longitudinal axis thereof and the blade is further provided with a cut-away portion 22, spaced slightly from the slot 21, to assist in the handling and sterilization thereof.

The opposed extremity of the cutting blade 18 terminates in a stem-like portion or shaft 23 which may be formed integrally therewith or otherwise rigidly secured thereto and which is externally screw-threaded as indicated at 24 for engagement with a complementarily internally screw-threaded wing-nut 25 or the like. To prevent inadvertent disengagement of the wing-nut from the shaft 23, this shaft is formed with a reduced threaded extremity 26 and a lock-nut 27, preferably provided with an appropriately knurled peripheral surface for the more convenient manipulation thereof, is engaged therewith.

As is more particularly illustrated in Fig. 5 of the drawing, the upper surface of the cutting blade 18 is provided with an upstanding lug 28, positioned adjacent the rear wall of the cut-away portion 22. Vertically disposed grooves or recessed portions 29 and 30 are provided in the

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side walls of the lug 28 which provide supporting means for trigger mechanism to be described more fully hereinafter.

Preferably the upper surface of the bottom wall of the recess formed in the enlarged portion 14 of the shank is provided with an arcuate groove 31 intended to receive the threaded shaft 23 and assist in guiding the movement of the cutting blade. To further support the trigger mechanism, laterally disposed ears 32 are provided upon the side edges of the cutting blade. These ears are preferably provided with an arcuate rear edge to eliminate a needlessly sharp or projecting corner and are located in substantial alignment with the lug 28 and immediately to the rear of the opposed grooves 29 and 30.

It will be understood that the cutting blade 18 rests upon the flat upper surface of the shank or base portion 10 and an upper blade 33 is provided, substantially complementary in configuration to the shank 10, the cutting blade being mounted for reciprocal movement therebetween. The upper blade also terminates in an enlarged and slightly oval-shaped distal portion 34 provided with a similarly oval-shaped aperture 35.

Preferably the lower surface of the blade 33 is horizontally disposed and the upper surface is gradually tapered, enlarging slightly from front to rear and provided with a recessed portion 36 extending from the rear or proximal extremity thereof intended for the accommodation of the threaded shaft 23. The upper blade is further provided with a longitudinally cut-away portion 37, through which the lug 28 on the cutting blade projects, and with a second longitudinally disposed cut-away portion 38, spaced slightly from the cut-away portion 37, to assist in the handling and sterilization thereof. The proximal extremity of the upper blade 33, together with the rear extremity of the cutting blade, fit snugly within the recess formed in the enlarged portion 14 of the shank or base 10 and suitable means is provided for maintaining the distal extremities of the shank 10 and upper blade 33, with the cutting blade 18 therebetween, in appropriately associated relationship.

A preferred embodiment of such means has been illustrated as diametrically opposed, downwardly depending ears 39, located upon the major axis of the enlarged portion 34 of the upper blade and preferably formed integrally therewith. The free extremities 40 of these ears are turned inwardly and, as is more fully disclosed in Fig. 6 of the drawing, the enlarged distal extremities 11 and 19 of the shank 10 and cutting blade 18, respectively, are thus maintained in proper associated relationship. To prevent any possibility of undue freedom of movement of the cutting blade between the upper and lower shank members, a threaded aperture 41 is provided in the upper blade 33 and a similarly threaded aperture 42 positioned in vertical alignment with the aperture 41 is provided in the shank 10. A locking screw 43, having an appropriately knurled head for convenience of manipulation, engages within the aligned apertures 41 and 42 and insures the snug retention of the cutting blade between the opposed horizontal surfaces of the upper blade 33 and shank 10. If desired, a resilient locking plate 44 may be provided upon the lower surface of the shank 10, positioned for frictional engagement with the knurled head of the screw 43 to prevent inadvertent loosening thereof. It will be observed that the screw 43 projects through the

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slot 21 in the cutting blade 18 and does not interfere with the necessary freedom of movement of such blade.

Any desired mechanism may be provided for imparting appropriate movement to the cutting blade 18. The preferred form thereof comprises a trigger member 45 including a downwardly depending and forwardly curved finger engaging portion 46 provided with a serrated surface 47. For convenience of assembly the trigger is formed in complementary parts and includes a horizontally disposed wall surface 48 located above the finger engaging portion 46. A vertically disposed end wall 49 is provided on the trigger member and the inner surface of this wall includes a vertically disposed rib 50 intended for engagement within the groove 29 of the lug 28 on the cutting blade. The free extremity of the wall surface 48 has an opposed end wall member 51 mounted thereupon, complementary in configuration to the wall 49. As will be more readily apparent from an examination of Fig. 9 of the drawing, the wall member 51 includes a reduced lower extremity 52 receivable within a groove 53 provided in the adjacent side of the trigger member. The inner vertical surface of the wall member 51 is complementary to the wall 49, including a vertically disposed rib 54 intended for engagement within the groove 30 of the lug 28 on the cutting blade.

The opposed inner surfaces of the walls 49 and 51 are recessed, as indicated at 55 and 56, respectively, to provide appropriate clearance for the shank 10, upper blade 33, and cutting blade disposed therebetween.

To securely mount the trigger upon the lug 28, the wall member 51 is provided with a horizontally and transversely disposed threaded aperture 57 and the wall 49 is provided with a horizontally disposed transverse aperture 58 positioned in accurate alignment with the threaded aperture 57. A locking screw 59 having a knurled head 60 is provided for maintaining the trigger parts in assembled relationship. This screw 59 is of sufficient length to project through the aperture 58 in the end wall 49 and an aperture 61 provided in alignment therewith in the lug 28 and engage within the threaded aperture 57 in the detachable wall portion or member 51.

The operative technique in handling the tonsil enucleator thus described is particularly simple. With the cutting blade in the position illustrated in Fig. 2 of the drawing, the instrument is grasped in the hand of the surgeon and the distal extremity is positioned below and behind the tonsil to be removed. The operator then gently pushes the tonsil through the aligned apertures in the distal extremities of the upper blade, cutting blade, and shank, using the index finger of the opposite hand. Pressure is then exerted upon the trigger, utilizing the index finger of the hand grasping the instrument for this purpose, and the cutting blade 18 of the device is raised to the position illustrated in Fig. 3 of the drawing where the tonsil is firmly caught by the forward edge 20' of the aperture 20. It will be observed that the edge 20' is not a sharpened cutting edge or surface, but is a vertically disposed and dull edge having the full thickness of the cutting blade. The wing-nut 25 is then gently threaded to the position illustrated in dotted lines in this figure of the drawing, suitable means being provided to temporarily retain the wing-nut in this adjusted position.

A preferred embodiment of such means com-

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prises a pawl 62 pivotally mounted as indicated at 63 upon an ear or the like 64 formed integrally with or otherwise secured to the upper surface of the top wall 17 of the enlarged portion 14 of the shank 10. One extremity of this pawl includes a depending finger 65 which projects through an aperture 66 formed in the top wall 17 and engages with the serrations or teeth of a ratchet 67 formed in the upper surface of the threaded shaft 28. The opposite extremity of the pawl, which may be conveniently manufactured from spring steel, or the like, comprises a resilient portion 68 of reduced thickness which engages against the upper surface of the wall 17 at a point remote from the pivotal mounting of the pawl 62. With the arrangement of parts thus described, it will be readily understood that as the wing-nut is tightened the finger 65 of the pawl progressively engages with the teeth of the ratchet, effectively preventing the return of the cutting blade to normal or inoperative position.

Tightening of the wing-nut 25 is then continued, the procedure being a gentle and gradual one, until the cutting blade is lifted to the position illustrated in Fig. 4 of the drawing, where the forward edge 20' has passed beyond the confines of the apertures 12 and 35, at which time the actual enucleation will have been completed. This technique is especially designed so that the cutting blade moves away from both the anterior and posterior pillars of the tonsil thereby reducing to an absolute minimum the possibility of damaging these structures.

It has been found in practice that the use of a dull cutting blade, as distinctly opposed to a sharp blade, tends to seal off the small blood vessels as it passes slowly behind the tonsil. This is considered particularly important, where the surgeon takes into consideration the blood clotting time of the patient. If an identical or even substantially similar length of time is taken for the completion of the severance, where the cutting blade is moved from the grasping position, illustrated in Fig. 3 of the drawing, to the final position disclosed in Fig. 4, the operation can frequently be completed without loss of blood by the patient.

The operative technique thus described is as simple as the device itself which includes no delicate or complicated parts which may get out of order or require unduly careful handling. The instrument can be readily and quickly assembled or disassembled and presents no problems in the sterilization thereof. It is particularly light in weight, may be conveniently grasped in either hand and function with a degree of efficiency heretofore unknown in the field of surgery with which we are here concerned.

It will be obvious to those skilled in this profession that various changes may be made in the instrument without departing from the spirit and scope of the invention and, therefore, the invention is not considered limited by that which is illustrated in the drawing and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. A tonsil enucleator comprising an elongated shank provided with an enlarged distal extremity having an oval-shaped aperture therein, an enlarged portion on the opposite extremity of said shank provided with a longitudinally disposed recess, a pistol grip handle depending from said shank adjacent said opposite extremity, a cutting blade supported upon said shank and movable longitudinally thereof, said cutting blade includ-

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ing an enlarged distal extremity provided with an oval-shaped aperture substantially identical in size to the aperture in said shank, the peripheral wall of the aperture in the cutting blade being perpendicularly disposed with respect to the longitudinal axis of said blade, a screw-threaded shaft on the opposite extremity of said cutting blade receivable within the recess in said shank and projecting through the end wall thereof, threaded means engaging the projecting extremity of said shaft and operable to move said cutting blade in a direction toward said handle, an upper blade complementary in configuration to said shank, an enlarged distal extremity on said upper blade having an oval-shaped aperture therein substantially identical in size to the aperture in said shank and coinciding therewith, the opposite extremity of said upper blade being receivable within the recess in said shank, diametrically opposed ears formed integrally on the enlarged portion of said upper blade and depending therefrom, inwardly directed extremities on said ears for engaging beneath said shank and maintaining said shank and upper blade in fixed relationship with the cutting blade movable therebetween, a longitudinally disposed slot in said upper blade located adjacent the proximal extremity thereof, an upstanding lug on said cutting blade projecting through the slot in said upper blade, trigger means mounted upon said lug and depending beneath said shank for moving said cutting blade in a direction toward said handle, ratchet teeth formed on the upper surface of said threaded shaft, and a resilient pawl pivotally mounted upon the enlarged portion of said shank and having a depending finger projecting through an aperture in said enlarged portion and engaging said ratchet to maintain said cutting blade in adjusted position.

2. A tonsil enucleator comprising an elongated shank provided with an enlarged distal extremity having an oval-shaped aperture therein, an enlarged portion on the opposite extremity of said shank provided with a longitudinally disposed recess, a pistol-grip handle depending from said shank adjacent said opposite extremity, a cutting blade supported upon said shank and movable longitudinally thereof, said cutting blade including an enlarged distal extremity provided with an oval-shaped aperture substantially identical in size to the aperture in said shank, the peripheral wall of the aperture in the cutting blade being perpendicularly disposed with respect to the longitudinal axis of said blade, a screw-threaded shaft on the opposite extremity of said blade receivable within the recess in said shank and projecting through the end wall thereof, threaded means engaging the projecting extremity of said shaft and operable to move said cutting blade in a direction toward said handle, an upper blade complementary in configuration to said shank, an enlarged distal extremity on said upper blade provided with an oval-shaped aperture substantially identical in size to the aperture in said shank and coinciding therewith, the opposite extremity of the upper blade being receivable within the recess in said shank, securing means for maintaining said upper blade and shank in fixed relationship with the cutting blade movable therebetween, a longitudinally disposed slot in said upper blade located adjacent the proximal extremity thereof, an upstanding lug on said cutting blade projecting through the slot in said upper blade, trigger

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means mounted upon said lug and depending beneath said shank for moving said cutting blade in a direction toward said handle, and pawl and ratchet means for maintaining said cutting blade in adjusted position when moved thereto by said trigger means.

3. A tonsil enucleator comprising an elongated shank provided with an enlarged distal extremity having an oval-shaped aperture therein, the major axis of said aperture being disposed transversely with respect to the longitudinal axis of said shank, an enlarged portion on the opposite extremity of said shank provided with a longitudinally disposed recess including top, side and end walls, an angularly inclined pistol-grip handle depending from said shank adjacent said opposite extremity, a cutting blade supported upon said shank and movable longitudinally thereof, said cutting blade being of complementary configuration to said shank, an enlarged distal extremity on said cutting blade provided with an oval-shaped aperture substantially identical in size to the aperture in said shank, the peripheral wall of the aperture in the cutting blade being perpendicularly disposed with respect to the longitudinal axis of said blade, a screw-threaded shaft on the opposite extremity of said blade receivable within the recess in said shank and projecting through the end wall thereof, threaded means engaging the projecting extremity of said shaft and operable to move the cutting blade in a direction toward said handle, an upper blade complementary in configuration to said shank, an enlarged distal extremity on said upper blade provided with an oval-shaped aperture substantially identical in size to the aperture in said shank and coinciding therewith, the opposite extremity of the upper blade being receivable within the recess in the enlarged portion of said shank, securing means for maintaining said upper blade and shank in fixed relationship with the cutting blade movable therebetween, a longitudinally disposed slot in said upper blade located adjacent the proximal extremity thereof, an upstanding lug in said cutting blade projecting through the slot in the upper blade, trigger means mounted upon said lug and depending beneath said shank for moving said cutting blade in a direction toward said handle, and means for maintaining said cutting blade in adjusted position when moved thereto by said trigger means.

4. A tonsil enucleator comprising an elongated shank provided with an enlarged distal extremity having an oval-shaped aperture therein, an enlarged portion on the opposite extremity of said shank provided with a longitudinally disposed recess, a pistol-grip handle depending from said shank adjacent said opposite extremity, a cutting blade complementary in configuration to the shank supported upon said shank and movable longitudinally thereupon, an enlarged distal extremity on said cutting blade provided with an oval-shaped aperture substantially identical in size to the aperture in said shank, the peripheral wall of the aperture in the cutting blade being perpendicularly disposed with respect to the longitudinal axis of said blade, a screw-threaded shaft on the opposite extremity of said blade receivable within the recess in said shank and projecting through the end wall thereof, threaded means engaging the projecting extremity of said shaft and operable to move said cutting blade in a direction toward

said handle, an upper blade complementary in configuration to said shank, an enlarged distal extremity on said upper blade provided with an oval-shaped aperture substantially identical in size to the aperture in the shank and coinciding therewith, the opposite extremity of the upper blade being receivable within the recess in said shank, securing means for maintaining said upper blade and shank in fixed position with the cutting blade movable therebetween, a longitudinally disposed slot in said upper blade located adjacent the proximal extremity thereof, an upstanding lug on the cutting blade projecting through the slot in said upper blade, and trigger means mounted upon said lug and depending beneath said shank for moving the cutting blade in a direction toward said handle.

5. A tonsil enucleator comprising an elongated shank provided with an enlarged distal extremity having an oval-shaped aperture therein, an enlarged portion on the opposite extremity of said shank provided with a longitudinally disposed recess, a pistol-grip handle depending from said shank adjacent said opposite extremity, a cutting blade complementary in configuration to the shank supported upon said shank and movable longitudinally thereof, an enlarged distal extremity on said cutting blade provided with an oval-shaped aperture substantially identical in size to the aperture in said shank, the peripheral wall of the aperture in the cutting blade being perpendicularly disposed with respect to the longitudinal axis of said blade, a screw-threaded shaft on the opposite extremity of said cutting blade receivable within the recess in said shank and projecting through the end wall thereof, threaded means engaging the projecting extremity of said shaft and operable to move said cutting blade in a direction toward said handle, an upper blade complementary in configuration to said shank, an enlarged distal extremity on said upper blade provided with an oval-shaped aperture substantially identical in size to the aperture in said shank and coinciding therewith, the opposite extremity of said upper blade being receivable within the aperture in said shank, securing means for maintaining said upper blade and shank in fixed relationship with the cutting blade movable therebetween, trigger means for moving said cutting blade in a direction toward said handle, and pawl and ratchet means for

maintaining said cutting blade in adjusted position when moved thereto by said trigger means.

6. A tonsil enucleator comprising an elongated shank provided with an enlarged distal extremity having an aperture therein, an enlarged portion on the opposite extremity of said shank provided with a longitudinally disposed recess, a pistol-shank handle depending from said shank adjacent said opposite extremity, a cutting blade movable longitudinally upon said shank and generally complementary thereto in peripheral configuration, an enlarged distal extremity on said cutting blade provided with an aperture substantially identical in size to the aperture in said shank, the peripheral wall of the aperture in said cutting blade being perpendicularly disposed with respect to the longitudinal axis of said blade, a screw-threaded shaft on the opposite extremity of said cutting blade receivable within the recess in the shank and projecting through the end wall thereof, threaded means engaging the projecting extremity of said shaft and operable to move said cutting blade in a direction toward said handle, an upper blade generally complementary in peripheral configuration to said shank, an enlarged distal extremity on said upper blade provided with an aperture substantially identical in size to the aperture in said shank and coinciding therewith, the opposite extremity of said upper blade being receivable within the aperture in the shank, means for maintaining said upper blade and shank in fixed relationship with the cutting blade movable therebetween, trigger means for moving the cutting blade in a direction toward said handle, and means for maintaining said cutting blade in adjusted position when moved thereto by said trigger means.

7. In a tonsil enucleator as set forth in claim 3, spaced side walls on said trigger means, one of said side walls being separable, vertically disposed ribs on the opposed inner surfaces of said side walls, said ribs being receivable within opposed grooves provided in the side walls of the upstanding lug, and means for maintaining said trigger mounted upon said lug, said side walls being grooved beneath said ribs to embrace said shank, cutting blade, and upper blade.

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No references cited